Education 351  David Rogosa

According to the Registrar

Course: EDUC 351, Sec 01
Title: Design and Analysis of Longitudinal Research
Min/Max Units: 3-3
Grading Basis: Satisfactory/No Credit
Days/Times/Classroom: T 02:15PM-05:05PM EDUC313

TEXT
Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence
Text Main Page (browsing encouraged)
Datasets, computer programs, and output for text

One substantive emphasis will be questions/problems in assessing improvement of students, schools and subgroups in educational assessment and school accountability

Course Contents

Part 1. Analyzing Growth and Change in Quantitative Outcomes

Intro via "Myths about longitudinal research"
1. Two observations a longitudinal study make.
2. The difference score is intrinsically unreliable and unfair.
3. You can determine from the correlation matrix for the longitudinal data whether or not you are measuring the same thing over time.
4. The correlation between change and initial status is
   (a) negative
   (b) zero
   (c) positive
   (d) all of the above
5. You can't avoid regression toward the mean.
6. Residual change cures what ails the difference score.
7. Analyses of covariance matrices inform about change.
8. Stability coefficients estimate
   (a) the consistency over time of an individual
   (b) the consistency over time of an average individual
   (c) the consistency over time of individual differences
   (d) none of the above
   (e) some of the above
9. Casual analyses support causal inferences about reciprocal effects.

Present technical details, derivations for measurement of change results.
Additional topics: Group growth, repeated measures.
Main Course Content: Data analysis for longitudinal Outcomes

Part II. Analyzing Durations and Series of Events
Survival analysis. Kaplan-Meier examples: Minitab, Itest SAS, LIFETEST
Cox regression, SAS PHREG:
Behavioral Observations, series of events

exercise: consider a population with true change between time1 and time2
Uniform [99,101] and measurement error Uniform [-1, 1], i.e. the measurement of
change is accurate to 1 part in a hundred.
What is the reliability of the difference score? try error Uniform [-2,2],
accuracy one part in 50.
Main References
to the measurement of change. Psychological Bulletin, 92, 726-748. [not available online]
research," plus supplemental questions. In The analysis of change, J. M.
Gottman, Ed. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 3-65. [not available online]
Rogosa, D. R., & Willett, J. B. (1983). Demonstrating the reliability of the
difference score in the measurement of change. Journal of Educational
Measurement, 20, 335-343.
available from John Willet's pub page

change and initial status; regression toward the mean
Additional Reference:
available from John Willet's pub page

Regression to Mean data ex
Myth 6, residual change scores, correlates of change.
Intro, time1-time2 regressions
A lengthy restatement of the Myths content with an emphasis on time1-time2 issues not present in the text is
available from John Willet's pub page

Mathematical foundation and results for collections of growth curves.
Introduction to formal data analysis approaches and results.
Chaps 3-4 ALDA text. (similar simpler treatment to text in
available from John Willet's pub page

Additional Readings
In Statistical modeling and latent variables, K. Haagen, D. Bartholomew, and M. Diestler, Eds.
Amsterdam: Elsevier North Holland, 259-281.
Another time1-time2 reading covering old-fashioned ground
Psychological Methods, 3(3) 309-327. apa link (from campus IP)

5. Oct 26. Growth Curve Data Analysis for multi-wave data
Reading (I've given up on bb.stanford.edu) ALDA Chap. 3,4,5,7
models.
Midterm Problems

1. Time1-time2, Measurement of change
   Some form(s) of time1-time2 regression analysis are widely used to investigate exogenous influences on change, variable W, and/or to control for initial status. With observations at the initial and final times denoted by X(I) and X(F) and defining D as the difference score for specific initial and final observations, and R as the residual change score for those variables compare the following possible analyses for both perfectly measured scores and scores obscured by measurement error. One set of artificial data useful for these comparisons is from the Myths chapter. Investigate the effects of choice of initial times, form of adjustments, measurement error. Especially useful are pointers to use in research literature. Possible regression analyses

   1. X(F) on X(I), W
   2. D on W
   3. R on W
   4. D on X(I), W
   5. R on X(I), W

   Augment by any identities or other results as interest dictates.

2. Growth-curve data analysis
   Using one of the four or five wave data sets Ramus, Rat or artificial data from Rogosa-Saner or North Carolina data carry out descriptive growth curve analyses and variance component estimation for the growth curve model. Interpret.
   Refer to Rogosa-Saner, ALDA Chap 4 (sec 4.4, 4.5), or class materials.

   Structural equations:
   Readings: ALDA Chap 8.
   Rogosa, D. R., & Willett, J. B. (1985). Satisfying a simplex structure is simpler than it should be. Journal of Educational Statistics, 10, 99-107. Jstor link [or on John Willett's pub page, whichever scan is better]
   Follow-up paper:
   Two Aspects of the Simplex Model: Goodness of Fit to Linear Growth Curve Structures and the Analysis of Mean Trends.

JStor link
above available from John Willet's pub page
also Stability section of Individual unit models versus structural equations
stability of school scores from educational assessments
# Confusions about Consistency in Improvement David Rogosa, June 2003

ALDA Chap 9-11, plus readings; data analysis examples, Kaplan-Meier

Full course sites on survival analysis: Stanford: Stat 262, Spring 2004
Johns Hopkins Biostatistics 140.641

Exercise: go to the new http://scholar.google.com/ and search on 'longitudinal research'

survival analysis, behavioral observations
ALDA Chap 13-15, Cox Regression, SAS PHREG
Reply to Discussants. Jstor link

10. Nov 30. Longitudinal data analysis and educational policy
a. value-added analysis
b. student progress in charter schools
Also, Nov 29 noon-1:15, e115. Economics of Education Seminar.
   Data Analysis Lessons from an Accidental Charter School Researcher
Background paper: Student Progress in California Charter Schools, 1999-2002